The history of Caesarean section*

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The high rate of cesarean section has been a major topic not only in the medical literature but also in the popular media. In this issue of CMAJ *(page 342) Dr. Kevin Tompkins laments the exclusion of the father from the operating room during cesarean section. In a 1935 issue of* CMAJ *Dr. J.P. Boley, a Windsor physician, wrote a short history of cesarean section; we repeat it in Encore.*

By Caesarean section is understood the operation by which the child is delivered through an incision in the abdominal wall and the uterus. Vaginal Caesarean section is the operation in which an incision is made *per vaginam* through the cervix and lower uterine segment. It does not properly come under Caesarean section.

Caesarean section is an exceedingly ancient operation. The oldest authentic record of a living child thus born is that of Gorgias, a celebrated orator of Sicily, 508 B.C. The operation on the dead woman has been done for ages, certainly in India, and possibly even by the early Egyptians. Numa Pompilius, one of the early kings of Rome, enacted in 600 B.C. the Lex Regia which expressly commanded the removal of the child before burial of its mother. This law persisted to the time of the Caesars, when it became the Lex Caesarea. From the latter designation the operation may have taken its name.

The term "Caesarean" is usually associated with the birth of Julius Caesar. His mother Aurelia died while he was still engaged in reducing Gaul to a Roman province. Those who hold that Caesar was removed from his mother's womb by an incision are on shaky ground, but on the other hand it is possible that she survived the operation done for obstructed labour. Shakespeare's oceanic mind takes notice of the most interesting operation of antiquity. Macbeth's dream of "a charmed life, which must not yield to one of woman born" is rudely shattered when from Macduff's own lips come the words "Macduff was from his mother's womb untimely ripped." Scipio Africanus, the conqueror of Hannibal, is also said to have been born by section.

There is no certainty that in those far-off times surgeons dared to have recourse to Caesarean section for saving the life of the mother and child. Up to the last century the profession was very sceptical as to the success of the operation. The earliest account of this procedure in any medical book appeared about the year 1350. (Reference is made to the fact that it is a proper procedure after the death of the mother).

Enrichment of the technique . . . by a simple sow-gelder

About the year 1500 the wife of a Swiss sow-gelder, by the name of Nufer, was pregnant for the first time. For days she had severe labour pains. The combined skill of a dozen midwives and barbers did not avail to deliver the patient. As there was no longer any hope of relieving her the husband said that if she would have confidence in him he would undertake an operation, which, by the grace of God, might possibly succeed. His wife replied that she would undergo anything to be relieved. The authorities at first turned a deaf ear to the husband's petition for permission to carry this out, but he was not one to take "No" for an answer. Returning with authority he told

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the patient's attendants that those having sufficient courage might remain in the room with him, otherwise they must clear out. After imploring Divine aid he laid his wife on a table, incised the abdominal wall, then the uterus, after which he quickly extracted the child. Several sutures were placed in the abdominal wall. The wound healed and the woman lived to be 77, and was able to bear several children, even twins, in the usual way, one of the children becoming a judge. This, to some authorities, has seemed too good to be true, and so it is held that our friend Nufer had merely to do with an advanced ectopic pregnancy. Another sow-gelder, some time later, is said to have removed the ovaries from his daughter, we are told, in consequence of her lasciviousness. As a result of the enrichment of the technique of operative midwifery by a simple sow-gelder, Caesarean section was now done repeatedly. It came to be performed in a somewhat more becoming fashion, and chiefly by barbers.

With the name and age of Ambroise Paré, who lived from 1510 to 1590, is associated the reform of midwifery. Podalic version had been in oblivion since the time of the early Hindoos, but it was revived and elaborated by the French of Paré's day. This renewed interest in version gave obstetrics a great stride forward, and the practice of Caesarean section on the living woman was promoted. Midwifery now fell at least partially into the hands of men, and from this time forward was liberated from its dependence on surgery and made a separate department.

François Roussett, physician to the Duke of Savoy, lived at the end of the 16th century and seems to have been the first writer to advise the operation on the living woman. His book, published in 1581, has the title "Treatise on Caesarean section, which is the extraction of the child by lateral incision of the abdomen and uterus of the pregnant woman who cannot be otherwise delivered, and without prejudice to the life of the one or the other, nor impairing subsequent pregnancy." In this work he gives the details of fifteen successful cases which were probably not all ectopic pregnancies, as some have had the boldness to suggest. Roussett's monograph established the operation. Obstetricians generally opposed the operation because of the high mortality. Slowly, however, it became a respectable procedure in those forlorn cases where the patient would almost certainly have died without it. The report of Roussett's successful cases encouraged certain operators to perform it without the proper indications, and the operation fell into disrepute in some places.

The earliest generally accepted Caesarean section was done in Germany in 1610. (Hernia of the gravid uterus with development of a living child). Trautman, of Wittenberg, was the operator, and the operation is well authenticated. The patient did very well until the twenty-fifth day, when she suddenly became faint and died within half an hour. The uterine wound was found to have already healed.

No one dared to place sutures through the uterine wall.

In succeeding years the literature frequently refers to this operation. A striking feature is that it was performed on the living woman for obstructed labour, and that the incision in the uterus was not sutured but left open. There was a persistent idea that the contraction and relaxation of the uterus forbade the use of the uterine suture. The maternal mortality was frightful, as the woman died from haemorrhage or infection. Operators depended on the muscular contraction of the uterus to control the bleeding from the incision. No one dared to place sutures through the uterine wall, because in those days all sutures had to be removed, and it was impossible to remove them from the uterine wall after the abdomen had been closed.

As we have seen, Caesarean section was apparently not practised on the living subject till about the 16th century. The writers of the 16th and 17th centuries, although describing the operation and frequently detailing successful cases, do not claim to have performed the operation themselves. They merely abstract their account from the writings or sayings of usually distant surgeons. In the 18th century serious consideration was given to devising an operation that offered a reasonable chance for the life of both mother and child. The hazard of the operation remained so great that few surgeons were bold enough to attempt it, even in desperate cases. In the mid-period of the 19th century the mortality of several series of collected cases was 50 to 85 per cent. Tarnier stated that no successful operation had been performed in Paris during the 19th century. The responsibility of these results was due, first, to septic infection, the evils of

which were especially felt in hospital practice; secondly, to postponement of the operation until the patient was almost moribund; thirdly, the failure to use uterine sutures. Closure in the few favourable cases was probably brought about by an inflammatory process which bound the uterus to the abdominal walls. Lebas, in 1769, was the first to use sutures in the uterine wound. He employed three stitches and left the ends long, so that they could be removed later. In view of the ignorance of asepsis and antisepsis, even this improvement did not do much to lower the mortality. Haemorrhage, infection, and discharges of the lochia into the peritoneal cavity, continued to cause the death of the mother.

The earliest published operation in America is that done by John Richmond in Ohio, 1827. The patient was a coloured woman, in labour for thirty hours, suffering also from eclampsia with convulsions. As a last resort he operated, at 1 a.m., with a few instruments from a pocket case. The incision in the uterus was directly over the placenta, which was therefore removed before the extraction of the child. The abdominal wall was sutured and a drain placed in the lower part of the wound. Twenty-four days later the patient was up and around.

In 1877 . . . after removing the child . . . a supravaginal hysterectomy was done.

Harris, of Philadelphia, published in 1871 a statistical study of Caesarean section in the United States. He collected 59 cases, with a mortality of 48 per cent. He found that sutures were used in only six cases, and in five of them the operation was done late in labour. He refers to Rodenstein, of New York, who advocated the use of sutures as a preventive of secondary gaping of the uterine wound and the escape of discharges into the peritoneal cavity, as well as the arrest of primary haemorrhage. Commenting on this, Harris is of the opinion that it is a matter for future determination whether the tendency of the suture to cause inflammation is not more than counterbalanced by its arresting haemorrhage and preventing the discharge of lochia into the peritoneal cavity.

In 1877, Porro, of Pavia, Italy, devised an operation to avoid the dangers of haemorrhage and infection from the large uterus which was poorly sewn up. After removing the child through the incision in the uterus a supravaginal hysterectomy was done.

A truly efficient uterine suture was introduced by Sanger, an assistant of Credé, in Leipzig in 1882. He insisted that the suturing of the uterus was essential. After careful suturing was carried out the results were as favourable as in the Porro-Caesarean section, without the mutilation of the latter operation. Sanger, moreover, improved the technique generally. He used the median abdominal incision, median uterine incision with or without eventration of the uterus. Interrupted sutures were carefully placed in the uterine incision so that the haemorrhage was controlled and the lochia did not discharge into the peritoneal cavity. In addition, extreme antisepsis was the rule. The operation of Sanger, called the "conservative Caesarean section", came to be a fairly safe procedure. The Porro, or "radical Caesarean section", still continued to be employed, but only in those cases where it became necessary to remove the uterus as the result of infection, tumour formation, or haemorrhage.

In spite of all improvements and a refined aseptic technique, which appeared later, the classical Caesarean operation left much to be desired. Firstly, it was not safe in the presence of infection. Secondly, postoperative complications were frequent; though seldom fatal, they were disturbing. Thirdly, peritoneal adhesions were often left, causing trouble later. Fourthly, the uterine scar might rupture in a subsequent labour. Fifthly, there was still a mortality of 1 to 10 per cent.

To obviate these faults Frank, of Bonn, in 1907 introduced an extraperitoneal Caesarean section. This was to avoid the spread of infection from the uterine wound into the peritoneal cavity. His method was a transverse incision through the abdominal wall just above the pubes and down to the peritoneum. The parietal peritoneum was incised transversely at the level of the bladder. This was followed by a transverse incision through the visceral peritoneum at about the level of the bladder reflection. The peritoneum over the lower uterine segment was stripped upward and united by sutures to the upper end of the parietal peritoneum. In this manner a pocket was formed which walled off the peritoneal cavity from the site of operation. He then incised the uterus transversely through its lower segment and extracted the child. The abdomen was closed without disturbing the sutured viscero-parietal peritoneum. He

reported 13 such cases without a death. This was an important contribution and was followed by many modifications.

Hugo Selheim, in 1908, clarified the surgical anatomy of the parts, demonstrating the advantage of delivering the child through the zone of dilatation, or exit passage, rather than through the contracting part of the uterus. He devised several methods of approach to the lower uterine segment. His work forms a basis for all later modifications. More than twenty different varieties of the low operation have been proposed. All have in common the object of avoiding the manipulation in the general peritoneal cavity as much as possible, and of placing the incision in the uterus entirely in the lower uterine segment. The idea is that an incision in the lower uterine segment will obviate peritonitis and also rupture of the uterine scar in a subsequent labour. DeLee is a strong supporter of the low Caesarean section, and urges its routine performance instead of the classical operation. We may say, therefore, that Selheim introduced the low Caesarean operation and DeLee perfected and popularized it.

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In 1924 Portes, of Paris, introduced an operation devised to do away with removal of the uterus in infected cases. An abdominal incision is made and the uterus is delivered through it unopened. Now the peritoneum at the lower angle of the wound is stitched to the cervix, making the abdomen water-tight around the cervix. Only when the entire abdomen has been closed is the uterus opened. The child and placenta are removed and the uterus sutured. The uterus is left lying on the abdominal wall and covered with moist dressings. Involution occurs in the usual way. After a month or more, or after the infection is gone, the abdomen is re-opened and the clean, involuted uterus is replaced. A number of infected patients who were thus treated have recovered, and in one case at least subsequent pregnancy has occurred. This operation has not gained much support in this country, the Porro section being preferred.

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The birth of King Richard III

It is for trouth reported, that the Duches his mother had so muche a doe in her travaile, that shee coulde not bee delivered of hym uncutte: and that hee [Richard III] came into the worlde with the feete forwarde, as menne bee borne outwarde, and (as the fame runneth) also not untothed.

— Sir Thomas More (1478–1535)
The History of King Richard III

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